We Claim:

1. A magnetoresistive semiconductor element, comprising:

a first contact made of a semi-magnetic material;

a second contact;

a layer of a nonmagnetic semiconductor configured between said first contact and said second contact; and

a tunnel barrier configured between said first contact and said layer of said nonmagnetic semiconductor.

2. The magnetoresistive semiconductor element according to claim 1, wherein said semi-magnetic material is a semiconductor.

3. The magnetoresistive semiconductor element according to claim 1, wherein said second contact is made of a nonmagnetic material.

4. The magnetoresistive semiconductor element according to claim 1, wherein said second contact is made of a semi-magnetic material.

5. The magnetoresistive semiconductor element according to claim 4, further comprising a tunnel barrier configured between said second contact and said layer of said nonmagnetic semiconductor.

6. The magnetoresistive semiconductor element according to claim 1, wherein said second contact is made of a ferromagnetic material.

7. The magnetoresistive semiconductor element according to claim 6, further comprising a tunnel barrier configured between said second contact and said layer of said nonmagnetic semiconductor.

8. The magnetoresistive semiconductor element according to claim 1, wherein said semi-magnetic material is a II-IV semiconductor.

9. The magnetoresistive semiconductor element according to claim 8, wherein said II-VI semiconductor is $Be_xMn_yZn_{1-x-y}Se$ with $0<x<1$, $0<y<1$ and $0.0001<y<0.2$.

10. The magnetoresistive semiconductor element according to claim 1, further comprising a Schottky diode for providing a current path for decoupling.

11. The magnetoresistive semiconductor element according to claim 1, further comprising a pn diode for providing a current path for decoupling.

12. A storage element, comprising:

the magnetoresistive semiconductor element according to claim 1; and

a ferromagnetic element configured adjacent said first contact.

13. The storage element according to claim 12, further comprising a Schottky diode for decoupling.

14. A field effect transistor, comprising: N/

a source electrode;

a drain electrode;

a gate electrode;

at least one first contact of a semi-magnetic material for injecting spin-polarized charge carriers into said source

electrode and/or for extracting spin-polarized charge carriers from said drain electrode;

a tunnel barrier configured between said first contact and said source electrode; and

a tunnel barrier configured between said first contact and said drain electrode.

15. A bipolar transistor, comprising:

a section acting as an emitter;

a section acting as a collector;

a region configured between said emitter and said collector and acting as a base;

at least one first contact for injecting spin-polarized charge carriers into said emitter and/or for extracting spin-polarized charge carriers from said collector;

a tunnel barrier configured between said first contact and said emitter; and

a tunnel barrier configured between said first contact and said collector.

16. A magnetic sensor, comprising:

a magnetoresistive semiconductor element including: a first contact made of a semi-magnetic material, a second contact, a layer of a nonmagnetic semiconductor configured between said first contact and said second contact, and a tunnel barrier configured between said first contact and said layer of said nonmagnetic semiconductor;

a plurality of electric feed and discharge lines, each one of said plurality of electric feed and discharge lines connected to a respective one of said first contact and said second contact; and

a measuring device connected to said plurality of electric feed and discharge lines for measuring a change in electrical resistance.

17. A read head for reading information stored in magnetic storage media, comprising:

a magnetoresistive semiconductor element including: a first contact made of a semi-magnetic material, a second contact, a

layer of a nonmagnetic semiconductor configured between said first contact and said second contact, and a tunnel barrier configured between said first contact and said layer of said nonmagnetic semiconductor;

a plurality of electric feed and discharge lines, each one of said plurality of electric feed and discharge lines connected to a respective one of said first contact and said second contact; and

a measuring device connected to said plurality of electric feed and discharge lines for measuring a change in electrical resistance.

18. A method of measuring the intensity of a magnetic field, which comprises:

providing a sensor having a first contact, a second contact, and a nonmagnetic semiconductor;

providing a magnetic field acting on the sensor for spin polarizing charge carriers in the first contact;

injecting the spin-polarized charge carriers across a tunnel barrier into the nonmagnetic semiconductor;

extracting the charge carriers from the nonmagnetic semiconductor into the second contact; and

measuring a change in resistance with respect to an initial state.

19. The method according to claim 18, wherein the initial state is formed by a resistance of the sensor without action of a magnetic field.

20. The method according to claim 18, wherein the charge carriers are electrons.